

87  
TM 6-210

*Handwritten note*  
**WAR DEPARTMENT**

**TECHNICAL MANUAL**

**CONDUCT OF FIELD ARTILLERY FIRE  
USING AIR OBSERVATION**

**April 5, 1941**



TECHNICAL MANUAL }  
No. 6-210

WAR DEPARTMENT,  
WASHINGTON, April 5, 1941.

CONDUCT OF FIELD ARTILLERY FIRE USING AIR  
OBSERVATION

U113  
.2  
TM 6:210  
★★

Prepared under direction of the  
Chief of Field Artillery

SECTION I. General.

Paragraph

Scope .....	1
Air observation .....	2
Types of observing aircraft .....	3
Assignment of aircraft .....	4
Types of missions .....	5
Communication .....	6
Target designation .....	7
Orientation and ground scale .....	8
Air observer .....	9
Prearrangement .....	10
General communication procedure .....	11
Balloon observation .....	12

II. Registration.

Types of registration .....	13
Registration by precision adjustment .....	14
Registration by center of impact .....	15
Miscellaneous methods of registration .....	16

III. Surveillance of fires.

General .....	17
Types of missions .....	18
Procedure .....	19
Corrections determined from surveillance of fires .....	20

IV. Adjustment.

General .....	21
Various methods of point or target designation .....	22
Types of adjustment .....	23
Bracket adjustment .....	24
Precision adjustment .....	25

SECTION V. Radio procedure.

	Paragraph
Scope .....	26
General .....	27
Allied procedure.....	28
Codes .....	29
The air-ground net.....	30
Use of the conventional call-up.....	31
Communication procedure for certain types of missions.....	32
Combating interference.....	33
Illustrative examples.....	34
Procedure for liaison and forward-observer communication .....	35
	Page
APPENDIX. Fire-control code.....	31

SECTION I

GENERAL

	Paragraph
Scope.....	1
Air observation.....	2
Types of observing aircraft.....	3
Assignment of aircraft.....	4
Types of missions.....	5
Communication.....	6
Target designation.....	7
Orientation and ground scale.....	8
Air observer.....	9
Prearrangement.....	10
General communication procedure.....	11
Balloon observation.....	12

1. **Scope.**—This manual covers the methods and procedure for the control of field artillery fire, using air observation.

2. **Air observation.**—To accomplish its mission with effectiveness and speed under conditions of modern warfare, the field artillery must be furnished with air observation. Ground observation is limited because large areas usually are defiladed. Air observation under favorable observing conditions permits a rapid conduct of fire because the amount of error, as well as its direction, can be sensed.

**3. Types of observing aircraft.**—*a.* The most important characteristic of the observing aircraft is the ability to remain in position long enough to accomplish its mission.

*b.* The airplane used for fire control should afford an all-around field of view and permit communication between the pilot and observer without use of interphone.

*c.* The ability to land in a restricted area is highly desirable; it permits landing in close proximity to the artillery command post, thereby facilitating prearrangement, permitting ready use of short flights at the time desired, and promoting better coordination between the artillery and the observer.

**4. Assignment of aircraft.**—Observing aircraft should be assigned to that headquarters which will enable the maximum amount of artillery to benefit. This will depend upon the types of missions and the number of airplanes available. For example, if only one airplane is available it should be assigned, for control, to the division artillery headquarters; the battalions, listening in on the same frequency, can take up any mission assigned them. Assignment of observation airplanes may vary from one per division to one per battalion; in any case, procedure must be flexible in order to make maximum use of air observation.

**5. Types of missions.**—There are three types of missions: registration, surveillance of fires, and adjustment on a target. *Registration* consists of firing on a point or locality for the purpose of obtaining data for later fires; with accurate registration, effective transfers on other targets can be made. When precise data have been prepared for a target, the initial fire should be accurate; in such a case, the observer executes *surveillance of the fire* by reporting the amount of error, which should be relatively small. When only the approximate location of the target is known, or the preparation of accurate data is impracticable, the observer must *adjust* the fire. With maps and photographs, surveillance of fires should be the rule; without them, adjustment will be necessary. Even with maps and photographs, adjustment will be necessary until the locations thereon of both gun and target are accurately known. With air photographs, registration is very rapid when the center of impact of a group of bursts can be located. In general, missions assigned to an air observer should include those which cannot be conveniently or accurately conducted from the ground. Regardless of the type of mission, the decision to deliver fire rests with the artillery commander. Short flights and brief missions should be considered the rule.

**6. Communication.**—*a.* The most effective means of communication between airplane and ground is two-way radiotelephone. The use of radiotelegraph requires highly trained operators. Air-ground radio and ground-air panels are also effective. Dropped or picked-up messages are often practicable, especially with marked photographs or maps. Visual signals, in general, are slow and impracticable; with prearrangement they may have limited use. With the captive balloon the telephone is used; it has the advantage of not being subject to enemy interception or interference.

*b.* With careful prearrangement, communication by two-way radio or by radio and panels may be reduced and sometimes eliminated.

**7. Target designation.**—It is essential that the same method of designating points be used by both the observer and the artillery. This is usually done with reference to a grid when both have the same map or photograph. Without map and photographs, targets may be designated with reference to points in the target area; these points must be identified from the air by the observer, and they must be plotted on the artillery firing chart in relation to the guns. When no such points are available, the artillery may sight on an airplane as it flies toward or over a target; or a group of rounds may be fired in the middle of the sector and their location corrected by the observer. In either case, after adjustment, this target may be used as a reference point for later fires.

**8. Orientation and ground scale.**—*a.* When conducting artillery fire, or when reporting a target with reference to some point, the observer must know the approximate direction of the gun-target line, and have some means of measuring distances on the ground. When the positions of the guns are known and maps or photographs are available, this usually is not difficult. In the absence of these, a "ladder" may be used. A ladder is fired by a single gun, usually the base piece. It consists of three bursts fired in rapid succession and placed at 300-yard intervals along the same line. The distance between extreme bursts is approximately 600 yards. The range of the ladder is considered as that of its center burst.

*b.* An approximate ground scale for adjustment of fire is furnished by the width of the initial sheaf, which is habitually computed as 100 yards.

**9. Air observer.**—An air observer must be highly trained, familiar with artillery organization and technique, and subject to the orders of the artillery commander. He must know the tactical situation and be able to analyze the details of the battlefield below him. He must know the established procedure for conducting

artillery fire and be familiar with all prearranged details not covered by such procedure.

**10. Prearrangement.**—The observer should be given a definite mission before he leaves the ground. It is possible to assign missions while in flight to experienced observers, but this requires much radio traffic and makes ground sets more susceptible to interference and to detection by position-finder stations. Routine matters for prearrangement should include—

- a.* Location of position areas and panel stations.
- b.* Location of target area and front lines.
- c.* Artillery headquarters to which the observer is assigned for control and the number of battalions for which he is to observe.
- d.* Type of communication.
- e.* Call letters and radio frequencies.
- f.* Code range, if any.
- g.* Method of point and target designation.
- h.* Locations of known points and targets.

**11. General communication procedure.**—The observer, upon arrival, checks in directly with the headquarters to which he is assigned. With normal prearrangement there is no need for an intermediate check-in with a higher headquarters. Upon completion of the mission, the artillery commander sends: **NO FURTHER NEED OF YOU; GO HOME.** If the observer is forced down, he sends: **GOING HOME, or FORCED TO LAND.**

**12. Balloon observation.**—Conduct of fire using the balloon is similar to that when using the airplane. The exceptions are—

- a.* The view of the terrain is more restricted than that from the airplane.
- b.* Telephone communication is used.
- c.* The observer may designate targets and report errors with respect to the balloon-target line as well as to the gun-target line. The first method is more convenient for the observer, the second for the fire-direction center. When sensing is done with respect to the balloon-target line, the location of the balloon must be plotted on the artillery firing chart; it is also necessary to plot the location of each adjusting burst or salvo before the data for the next firing commands can be determined.

## SECTION II

## REGISTRATION

	Paragraph
Types of registration.....	13
Registration by precision adjustment.....	14
Registration by center of impact.....	15
Miscellaneous methods of registration.....	16

**13. Types of registration.**—Normally, registration is done by a precision adjustment on a fixed point or object, or by determining the center of impact of a group of bursts. When air photographs of the target area are available, the center-of-impact method is preferable; it is much quicker and requires little or no communication.

**14. Registration by precision adjustment.**—*a. General.*—The method of conducting a precision adjustment is given in paragraph 25. This type of registration normally will consume much of the observer's time in the air and should be used only when centers of impact are impracticable, or when previous registration by ground observers is impossible.

*b. Prearrangement and procedure.*—The observer is shown on a map, or air photograph with few details, the locations of the points of registration for each battalion; usually one check point per battalion is sufficient. The order of registration is also given the observer. After taking off and checking in with the artillery command post, he sends: FIRST BATTERY, FIRE, and proceeds with the adjustment. The initial data for firing will sometimes be accurate, sometimes only approximate; in either case, a ladder, preferably of smoke shell, will help the observer if he is not sure of his ground scale and orientation. This ladder may be fired by prearrangement, or by request from the observer; in the latter case he simply precedes the message above by: LADDER, SMOKE.

*c. Procedure without maps or photographs.*—When maps and photographs are not available, it will be necessary to describe to the observer the terrain feature upon which registration is to be made; or he may select this point himself. In the latter case, the initial data for firing may be determined by lay-on-me methods. (par. 22*b*(3)), or the observer may correct an initial burst of smoke placed near the center of the normal zone. An example of a precision adjustment is given in paragraph 34*i*.

**15. Registration by center of impact.**—*a. Procedure.*—Normally, registration is conducted by one gun per battalion. In some situations, each battery of the battalion may register. The registering piece uses the same deflection setting and quadrant elevation for



each round of the group. These rounds, usually four or six, are fired in rapid succession, preceded by one or two rounds of smoke, if necessary for identification. These bursts may be placed anywhere in the battalion sector, but it is preferable to place them near the base point or a check point, or near any terrain features which will enable the observer to identify, on his photograph, the location of the center of the bursts. He then marks with a pinpoint the center of impact on his photograph and reports the location by radio, or later drops the photograph at the artillery command post. The initial data for its registration should be determined by each battalion before the observer arrives, so that no time will be lost in firing the successive groups of bursts.

*b. Prearrangement and communication.*—The observer must know the order in which the battalions or batteries are to register, and the probable areas of impact should be marked and numbered on his photograph. Radio communication may be eliminated entirely if, by prearrangement, the observer identifies himself in some manner, such as circling over the senior artillery command post, this being the signal for firing the groups of bursts at specified intervals. However, two-way radiotelephone permits the quickest registrations; the observer reports the location of one center of impact and immediately calls for the next one. The intervals between the registrations may be reduced or increased depending upon the difficulty of locating the necessary points on the photograph. In missions of this type, the radio transmissions of the ground sets are so few and simple that panels may easily be substituted. When calling for registrations in turn, the observer sends: **FIRST BATTERY, FIRE; ----- SECOND BATTERY, FIRE; -----** etc. The order of firing is prearranged before the observer arrives. Examples of center-of-impact registrations are given in paragraph 34*a* and *b*.

*c. Areas without identifiable terrain details.*—Sometimes a group of bursts may fall on an area devoid of identifiable terrain details. In this case the observer may move the bursts to a better locality by sending, for example: **100 LEFT, 500 SHORT.**

**16. Miscellaneous methods of registration.**—*a. Initial target.*—When an initial adjustment has been made on some target without previous registration, such adjustment may be considered as a registration and the target used as a reference point for designation of other targets (par. 7).

*b. Center of impact without maps and photographs.*—When maps and photographs are not available, center-of-impact registrations may still be used provided the observer can recognize the areas of

impact of the groups of bursts and use their centers as reference or check points for later designation of targets.

*c. Ladder.*—In an extreme case when speed is essential, maps and photographs are not available, ground registrations are impossible, no points in the target area can be designated to the observer, and the observer does not know the locations of the battalion position areas, a smoke ladder may be fired by one battalion, or by two or more battalions in turn. This furnishes the observer with a ground scale, shows him the approximate line of fire of each battalion, and, by remembering or recording the location of the center round of each ladder, he has reference points for later designation of targets.

*d. Adjustments after registration.*—After each type of registration described in *a*, *b*, and *c* above, adjustments will be the rule. Initial firing data for subsequent targets usually will not be sufficiently accurate for surveillance.

### SECTION III

## SURVEILLANCE OF FIRES

	Paragraph
General.....	17
Types of missions.....	18
Procedure.....	19
Corrections determined from surveillance of fires.....	20

**17. General.**—When precise firing data can be prepared, minor corrections, rather than detailed adjustment, should suffice to place the fire on the target. The errors of the initial volleys (or other form of fire) may be determined in each case by an air observer executing surveillance of these fires. He should report these errors as quickly as possible in order that any incompleting zone fire may be corrected. All targets or areas must be positively identified by the observer.

**18. Types of missions.**—*a.* Targets for surveillance are generally of two types: those designated to the observer before he takes off, and those designated to or located by him after he is in the air.

(1) The first type includes missions fired on a time schedule or on call; those on call include requests from the ground, or from the observer if he identifies a target in one of the previously designated localities.

(2) The second type includes targets located after the observer is in the air. Such targets may be designated by the artillery com-

mander or by the observer; in either case the location must be given accurately, usually with reference to some form of grid.

b. In the absence of any point designation system, the observer may drop a marked photograph, map, or sketch at the artillery command post, and furnish surveillance later. If, because of hostile activity, he can no longer observe, accurate fires on these targets are still possible if there has been previous registration.

**19. Procedure.**—*a. Prearrangement.*—The observer may be given a mission which includes one or both types of surveillance mentioned in paragraph 18. For the first type he must be furnished a marked photograph, map, or sketch, in order that he may positively identify the targets after he is in the air. For the second type, he must be able to report or determine the accurate location of targets, depending upon whether they are designated by him or from the ground. The observer should know the number of battalions for which he is to observe, and the locations of their position areas.

*b. Communication and conduct of fire.*—(1) For schedule fires, little communication is necessary; the observer simply notes the errors of the initial fire and reports, for example: CONCENTRATION (or No.) 35, 20 LEFT, 50 OVER. Errors are measured as accurately as his ground scale will permit. For fires on call from the ground, the artillery commander sends, for example: CONCENTRATION 76, SURVEILLANCE; the observer acknowledges: WILCO; and later reports the errors of the initial fire. If the observer sees enemy activity in one of the previously designated areas, he may send: CONCENTRATION 52, HOSTILE RESERVES, REQUEST BATTALION, SURVEILLANCE. The artillery commander acknowledges: ROGER; and later sends, for example: SECOND BATTALION WILL FIRE. This battalion, listening in, acknowledges receipt (in this case to the division or to a groupment), and later reports to the observer when each of its batteries has fired; or, if all batteries fire simultaneously, report is made that the battalion has fired.

(2) When a target is located while the observer is in the air the procedure is the same except that photograph or map coordinates are used for the initial designation of the target. The identification number of the target is furnished the observer as soon as practicable.

(3) In general, the communication procedure for surveillance of fires is relatively simple and is more or less indicated by each type of mission. As a rule, the observer reports the errors of the individual batteries or battalions, if practicable; otherwise he reports on the mass of the initial volleys as a whole.

*c. Designation of target.*—Unless prearranged otherwise, the designation of a target refers to the center of the area. The initial volleys are computed for the center range and the observer senses them, or the mass of fire as a whole, with respect to the center of the area.

**20. Corrections determined from surveillance of fires.**—The observer's time in the air will often be limited. Advantage must then be taken of reported errors in order that corrections may be applied for later targets. It is better to consider the errors of more than one target, in order to determine if they are persistent in one direction. In this sense, surveillance of fires is also a form of registration. When it is necessary to repeat fire on a target later, any corrections determined during the interval should be applied.

## SECTION IV

### ADJUSTMENT

	Paragraph
General.....	21
Various methods of point or target designation.....	22
Types of adjustment.....	23
Bracket adjustment.....	24
Precision adjustment.....	25

**21. General.**—Adjustment consists of correcting the observed positions of the bursts in order to obtain data sufficiently accurate to begin fire for effect on the selected target. The data determined by one battery or battalion may be used by other batteries or battalions. Adjustment missions require the greatest amount of time and air-ground communication.

**22. Various methods of point or target designation.**—*a. With maps and photos.*—When maps and photographs are used, adjustment will be necessary until the accurate locations of both guns and targets are known. Photograph or map coordinates are used to designate targets, usually to the nearest 100 yards. Sometimes the observer may drop a marked photograph or map.

*b. Without maps and photographs.*—(1) *With respect to a line joining position and target areas.*—The observer may designate a target by giving its direction as so much right or left of the line running generally through the battalion position area and some known point in the target area, and by giving its distance short of or beyond this point. If this method is to be used when adjusting for more than one battalion, the location of both point and line must be prearranged, and the fires of the various battalions coordinated through the medium of a common firing chart.

(2) *Using points of the compass.*—A target may be designated by giving its direction from a known terrain feature, for example: ENEMY BATTERY, 200 WEST, 600 NORTH OF RAILROAD CROSSING.

(3) *Lay-on-me method.*—(a) *Airplane flying over targets.*—When there are no known points for designation of targets, the observer may send, for example: LAY ON ME, ALTITUDE 4000 (if the altitude has been prearranged, it need not be mentioned unless necessary to change it). The artillery commander acknowledges: ROGER; and directs an adjusting battery to follow the airplane with an instrument. The airplane flies along the gun-target line and, when directly over the target, makes an abrupt turn. The initial firing direction for the battery is taken directly from the plane, using the instrument reading. Range is computed, using the altitude of the airplane and its angle of site at the time of turning.

(b) *Airplane unable to fly over target.*—When the airplane cannot fly over the target area, it may give direction by flying only a part of the way, or by flying straight to the rear. In this case, the observer must give an estimated range; or, if a code range has been prearranged, he may send, for example: 400 MORE.

(4) *Using a group of bursts.*—When there are no reference points for target designation, a group of bursts may be fired near the middle of the normal zone of the artillery unit; the observer senses their location with respect to the target that he has selected. The bursts may be fired by the battery or by a single piece, or they may be fired as a ladder (par. 8).

c. *Marking base (check) point.*—When the observer cannot identify any of the reference points indicated to him by prearrangement, he may request, for example: MARK BASE POINT. One or more bursts, preferably smoke, are then fired at the base points, using data determined from previous registration or other accurate means.

**23. Types of adjustment.**—There are two types, bracket adjustment and precision adjustment. Bracket adjustment is normal and is used when no type is specifically designated. Precision adjustment may be used for registration (par. 13), or for adjusting weapons of large caliber on important targets. If not prearranged, it may be requested by either the artillery commander or the observer by sending: PRECISION ADJUSTMENT.

**24. Bracket adjustment.**—a. *Accuracy and speed.*—The priority of speed or accuracy must be decided in each individual case. In general, speed is more important after the opening of fire than before. When designating a target initially, and when reporting the errors

of the adjusting salvos, the observer should measure the distances as accurately as his ground scale will permit. Accurate initial data help in identifying the initial salvo, and usually result in early fire for effect.

*b. Initial data.*—The deflection is computed to place the mean line of fire through the center of the target. The width of the initial sheaf (distance between flank bursts) habitually is 100 yards. The site is computed or estimated, when possible; otherwise it may be taken as zero. The method of fire during the adjustment is **BATTERY RIGHT**. Smoke shell may be used initially if visibility is poor, data are inaccurate, other artillery is firing in the vicinity of the target, or if there is likelihood of the rounds being lost.

*c. Designation of target.*—(1) The observer may give the location of the target by any of the methods indicated in paragraph 22. Unless prearranged otherwise, the initial designation of the target refers to the center of the area. The observer may send, for example: **KN 3-8 (photograph coordinates) -----, 5623 (abbreviated coordinates, battle-map grid) -----, or BASE POINT IS 150 LEFT, 300 OVER -----**; if the latter method is used, the base point is considered as the last burst fired and therefore the initial shifts for deflection and range are applied in exactly the same manner as when correcting the salvos which follow.

(2) Upon receipt of the designation of the target by the observer, the artillery commander immediately acknowledges: **ROGER**; and then notifies the observer of the battalion assigned to the mission (unless the observer was originally assigned to a single battalion). This battalion acknowledges, to the division or groupment, for the assignment, and then sends the observer, for example: **CONCENTRATION 63, BATTALION WILL FIRE, BATTERY B (ADJUSTING)**; this indicates that Battery B will adjust and that the other batteries of the battalion will fire for effect, using the adjusted data (the identification number may be furnished later, if more convenient).

(3) When an observer reports a target, it is assumed that he is ready to observe and adjust; except as indicated in (2) above, he will be given only the preliminary warning: **BATTERY FIRED**. If, for any reason, he desires to control the time of fire, he may send: **AT MY COMMAND**; then, after receiving the message **BATTERY READY**, he sends **FIRE** at the appropriate time. To remove this method of fire, the observer need only follow his next group of sensings with the command **FIRE**. From then on the battery will fire without command.

*d. Conduct of fire.*—(1) *Adjustment.*—Fire is opened with a salvo, using data prepared by personnel at the fire-direction center. If the observer does not see the bursts, he reports LOST, and steps should be taken to increase the chance of observing the next salvo, such as by changing deflection and range or using smoke shell. If the bursts can be identified, he senses the burst center with respect to the center of the target and sends, for example: 70 LEFT, 250 SHORT. If the sheaf is too narrow or too wide, he sends SHEAF NARROW, or SHEAF WIDE, and an arbitrary change of deflection difference, usually 5 mils, is made on an interior piece. The sequence of sensing is the same as that of giving fire commands; no announcement is made of an element that is correct, except that the range sensing is always given. After each of the observer's reports, corrections equal and opposite to the sensings are applied, and the adjustment continues until sufficiently accurate for fire with effect.

(2) *Fire for effect.*—The decision to fire for effect rests with the artillery commander, however, the observer should request it when he considers the adjustment sufficiently close; he may send, for example: 50 SHORT, FIRE FOR EFFECT. The adjusting battery may fire immediately, or, if other batteries are to come in, it may fire in unison with them. If other battalions are to fire as a result of the adjustment, data must be quickly transmitted to them, and the observer notified, for example: FIRST AND SECOND BATTALIONS WILL FIRE (this includes the adjusting battalion). Depending upon the mission and type of target, single batteries may fire when ready, the batteries of each battalion may fire in unison, or all battalions may fire simultaneously. Within any single battalion, each battery may begin its fire for effect in a different manner in order that the observer may possibly distinguish the fire of each. For example, one battery may begin with a salvo from the right, one may fire a volley, and another a salvo from the left. Initial volleys or salvos for fire for effect are computed for the center range. The observer senses for each battery or battalion, if practicable; otherwise he senses on the mass of fire as a whole. He should report the errors as quickly as possible in order that any incompleting zone fire may be corrected. Examples of bracket adjustment are given in paragraph 34*f* and *g*.

*e. Avoiding direct adjustment.*—Direct adjustment upon a target may result in loss of surprise before fire for effect is delivered. To prevent this, an adjustment may be made on some nearby point or locality whose distance from the actual target is known with fair accuracy. This type of mission may be prearranged with the observer. His initial designation of the target is the same as for other types of

adjustment except that the designated location refers to the point of adjustment. When the adjustment is completed, the observer's request for fire for effect must be preceded by the sensings which will move the fire to the actual target, for example: 300 SHORT, FIRE FOR EFFECT.

**25. Precision adjustment.**—The procedure is similar to that of ground conduct of fire. Adjustment is by single piece. The gunner's quadrant is used. During adjustment, each round is sensed with respect to the adjusting point, or the center of the target. When the trial elevation has been obtained, the message BY SERIES OF 3 ROUNDS is sent to the observer; he senses the deflection error of the group and the range of each round, for example: 20 RIGHT, OVER, SHORT, OVER. A second group of three rounds usually completes the adjustment. The adjusted elevation is computed in the same manner as for axial and lateral conduct of fire.

## SECTION V

### RADIO PROCEDURE

	Paragraph
Scope.....	26
General.....	27
Allied procedure.....	28
Codes.....	29
The air-ground net.....	30
Use of the conventional call-up.....	31
Communication procedure for certain types of missions.....	32
Combating interference.....	33
Illustrative examples .....	34
Procedure for liaison and forward-observer communication.....	35

**26. Scope.**—This section covers the radio procedure for the control of field artillery fire, using air observation. The procedure for forward ground observers is essentially the same and it is also included.

**27. General.**—The control of artillery fire by radio requires a special procedure designed for brevity, simplicity, and economy of time. Economy of time is particularly essential in the use of air-plane observation. Careful prearrangement as to the observer's mission and the method of communication may eliminate much of the prescribed routine procedure. Prescribed procedure should be used as a guide for training of observers and operators. However, it is a means and not an end, and it should be altered or omitted when it is apparent that strict adherence thereto is hindering the delivery of fire.



**28. Allied procedure.**—Operating regulations, station records, and the procedure to be used in establishing communication will be found in chapter 5, FM 24-5, and in TM 11-454. The procedure outlined in FM 24-10 will govern.

**29. Codes.**—*a. Fire-Control Code.*—The Fire-Control Code is used by air and ground observers when fire-control messages are transmitted by radiotelegraph; this facilitates communication for observation and conduct of fire. The Fire-Control Code is not used in voice transmissions by either wire or radio; however, for uniformity in training radio operators, the clear text equivalent of the code group is used in transmitting fire commands and sensings by radiotelephone. Operators should memorize those code groups most commonly used by their units.

*b. Air-Ground Liaison Code.*—The Air-Ground Liaison Code is used by the field artillery primarily for transmitting tactical information. It may be used for the designation of targets for artillery fire control when appropriate code groups do not exist in the Fire-Control Code. *In no case should groups from both codes be mixed in the same message.*

**30. The air-ground net.**—*a. General.*—The air-ground net of the division artillery includes the division artillery headquarters station (NCS) and the battalion stations. The net is organized on a given frequency (W) as a directed net when a single airplane is present or expected, or on a schedule prescribed by the division artillery headquarters. At all other times the net is silent.

*b. Using one airplane.*—Each battalion is assigned a frequency (W, X, Y, Z, or —) to be used when an airplane is to work only with that battalion. If all units are to use one airplane successively, all stations will work on the frequency (W), or to a designated medium battalion if there is more than one.

*c. Using two or more airplanes.*—If more than one airplane is available, each is assigned to a battalion or group of battalions, and a frequency is designated for each airplane. These arrangements are made by the division artillery headquarters prior to the take-off of the airplane. Each airplane then reports directly on the prearranged frequency to the battalion or group station that will control its mission. It will be most unusual to require an airplane to change frequency while in flight; if a change in frequency is necessary, ground stations change to the frequency of the airplane.

**31. Use of the conventional call-up.**—When the air observer has had little work with a particular artillery unit, considerable use of the conventional call-up (e. g., 4CZ V AP1) may be necessary

initially, instead of prefacing a transmission (radiotelegraph) by the break sign **BT**. The break sign may be substituted for the call-up after communication has been established and no interference or difficulty of communication is anticipated.

**32. Communication procedure for certain types of missions.**—*a.* For center-of-impact registrations and certain types of surveillance missions, transmissions from the ground radio set will be few and simple, such as, **REPEAT**, **BATTERY FIRED**, and the acknowledgment, **WILCO** or **ROGER**. In such cases, a few simple panel signals may be substituted for the radio. The complete panel station will not be needed; it involves too much personnel and too many panels for the purpose desired. Usually three panels will be sufficient, two of them remaining fixed, while the third one is moved to indicate the desired signal. On other occasions no radio, ground or air, will be needed; the appearance of the airplane may be the signal to fire, and the observer accomplishes his mission by dropping a marked photograph.

*b.* For other types of surveillance missions and for adjustments (bracket and precision), radio transmissions will be increased. However, most of these transmissions come from the air, and panels may still be used to advantage.

**33. Combating interference.**—Hostile radio stations can interfere deliberately with radio communication used in the control of artillery fire, by blocking a single frequency or a band of frequencies, and by deception, that is, causing our stations to accept false or erroneous information, sensings, and fire commands. The effects of interference can be minimized by—

- a.* Training radio operators to work through interference.
- b.* The strictest observance of radio discipline and radio security.
- c.* Frequent changes of call signs and frequencies.
- d.* Limited use of the conventional call-up.
- e.* Short, quick transmissions.
- f.* Limiting the number of stations in a net.
- g.* Careful prearrangement as to methods to be used, and as to the mission of the observer.
- h.* The use of prearranged signals or groups of letters preceding each transmission to identify the station making the transmission. If such a method is adopted, each signal or group should be numbered; the sequence should not be repeated, nor should any standardized code or cipher be employed. An arbitrary list of signals or groups of sufficient length for the period of station operation will be found most satisfactory. After the list has been used once, it should be destroyed.

**34. Illustrative examples.**—The examples which follow are given as guides for the training of air observers and radio operators. The Fire-Control Code is used for radiotelegraph transmissions; radiotelephone equivalents are also given. The conventional call-up and prearranged transmissions for identification have been omitted.

*a. Example 1.*—(1) *Mission.*—An air observer has the mission of registering, in rapid succession, one battery from each battalion of the division artillery, using centers of impact. The observer is to mark with a pinpoint the location of each center of impact on an air photograph. When these are completed, the air photograph is to be dropped at the command post of the division artillery.

(2) *Prearrangement.*—The method is explained to the observer. He is given an air photograph of the target area, on which are marked the probable areas of impact. He is informed that, when ready, he is to call for each battery in turn by saying: **FIRST BATTERY, FIRE;** ——— **SECOND BATTERY, FIRE,** etc. Each battalion, listening in, will direct its registering battery to fire at the proper time. The airplane and all battalions are to work on the same frequency. The observer is to check in with the net-control station (division artillery) and then proceed with his mission with no establishment of communication with battalions. The location of the command post, where the photograph is to be dropped, is indicated to the observer.

(3) *Communication.*—The observer, having arrived over the position area and having established communication, transmits:

<i>Radiotelegraph</i>	<i>Radiotelephone</i>
<b>BT</b> -----	
<b>FP</b> -----	First.
<b>BA</b> -----	Battery.
<b>IX</b> 5-second dash-----	Fire.
<b>K</b> -----	Go ahead.

The battalion concerned replies:

**R**----- Roger.

and, when the battery fires the first round, transmits:

<b>BT</b> -----	
2-second dash-----	Battery fired.
<b>K</b> -----	Go ahead.

BT-----	
FP-----	First.
BA-----	Battery.
IX 5-second dash----	Fire.
K-----	Go ahead.

$\overline{\text{BT}}$ -----  
 2-second dash----- Battery fired.  
 $\overline{\text{K}}$ ----- Go ahead.

Original from  
UNIVERSITY OF CALIFORNIA

The ground station receipts:

R----- Roger.

When ready, the observer calls for the next battery:

BT-----

SP----- Second.

BA----- Battery.

IX 5-second dash---- Fire.

K----- Go ahead.

The battalion concerned replies:

R----- Roger.

The registrations then continue as indicated for the first and second batteries.

*c. Example 3.*—(1) *Mission.*—An air observer has the mission of surveillance of fires for a groupment of three battalions of medium artillery. The groupment is part of the division artillery. The observer is to report the errors of the initial volleys as quickly as possible in order that any remaining zone fire may be corrected.

(2) *Prearrangement.*—The observer does not check in with the division; he reports directly to the groupment; the three battalions are to listen in on the same frequency. The locations of the position areas and the panel stations are indicated on a photograph. The observer understands that panels are to be used in the event of radio silence of ground sets. He is given a gridded photograph. On this photograph are marked several areas of possible hostile activity. He is to call for fire upon any targets appearing in these areas; or, using the grid for accurate designation, he may call for fire on targets of his own selection in other areas. The fires of one or more battalions may be placed on any target, each battery firing when ready. If more than one battalion is to fire, the observer is to sense on the initial volleys as a whole.

(3) *Communication.*—When the observer sees activity in one of the previously marked areas, he transmits:

BT-----

CN----- Concentration.

52----- Five two.

CP----- Command post.

SV----- Surveillance.

K----- Go ahead.

The ground station (groupment) replies:

R----- Roger.

and then sends:

BT-----  
 BN----- 12th Battalion will fire.  
 12-----  
VA----- That is all.

The 12th Battalion receipts to groupment as follows:

BK7----- BK7 (call sign of groupment).  
 V----- From.  
 AU3----- AU3 (call sign of battalion to fire).  
 R----- Roger.  
VA----- That is all.

This is not only to insure receipt of the groupment's message but also to allow the airplane to tune accurately to the battalion's frequency. Then, as soon as each battery fires, the battalion transmits:

BT-----  
 BA----- Battery.  
 A----- A (Affirm).  
 2-second dash----- Fired.  
 BA----- Battery.  
 B----- B (Baker).  
 2-second dash----- Fired.  
 BA----- Battery.  
 C----- C (Cast).  
 2-second dash----- Fired.  
K----- Go ahead.

The observer notes the errors of the three volleys and replies:

BT-----  
 BA----- Battery.  
 A----- A (Affirm).  
 30----- Three zero.  
 LL----- Left.  
 50----- Five zero.  
 SS----- Short.  
 BA----- Battery.  
 B----- B (Baker).  
 CR----- Range correct.  
 BA----- Battery.  
 C----- C (Cast).  
 50----- Five zero.  
 00----- Over.  
K----- Go ahead.

The ground station (battalion) acknowledges:

R----- Roger.

All batteries now correct their zone fire. The observer watches the fire as a whole, and transmits:

BT-----

RZ----- Mission accomplished.

K----- Go ahead.

The ground station (groupment) now assumes control and transmits:

BT-----

R----- Roger.

FI----- Follow instructions.

K----- Go ahead.

The observer receipts for the message and proceeds to look for other targets.

*d. Example 4.—(1) Mission.*—Same as in example 3 (*c* above).

(2) *Prearrangement.*—Same as in example 3 (*c* above), except that all initial volleys, whether by one or more battalions, will be fired simultaneously.

(3) *Communication.*—The observer sees infantry assembling and transmits:

BT-----

CY 34 62----- C (Cast) Y (Yoke) three four dash  
six two.

JA----- Infantry assembled.

SV----- Surveillance.

K----- Go ahead.

The groupment acknowledges:

R----- Roger.

AS----- Wait.

and notifies the 15th and 16th Battalions to lay all batteries on the target just designated and to report when laid. The observer is then notified:

BT-----

CS----- Concentration.

62----- Six two.

BN----- 15th and 16th Battalions will fire.

15-----

BN-----

16-----

K----- Go ahead.

The observer acknowledges:

R..... Wilco.

When the simultaneous volleys have been fired at the command of the groupment, the ground station transmits:

BT.....  
 BN..... 15th and 16th Battalions.  
 15.....  
 BN.....  
 16.....  
 2-second dash..... Fired.  
 K..... Go ahead.

The observer, noting the fire as a whole, answers:

BT.....  
 50..... Five zero.  
 00..... Over.  
 K..... Go ahead.

The groupment acknowledges:

R..... Roger.

and the battalions listening in, correct their zone fire. The observer, after having watched the fire, sends:

BT.....  
 GO..... Going home (forced to land).  
 VA..... That is all.

*e. Example 5.—(1) Mission.*—Same as in example 3 (*c* above).

(2) *Prearrangement.*—Same as in example 3 (*c* above), except that all initial volleys, whether by one or more battalions, will be fired simultaneously.

(3) *Communication.*—The artillery commander has received a request to place fire upon an area from which much infantry cannon is firing. A transfer is to be made, using one battalion. He sends the observer:

BT.....  
 DZ 84 16..... D (Dog) Z (Zed) eight four dash one six  
 JH..... Infantry cannon.  
 CN..... Concentration.  
 68..... Six eight.  
 BN..... 8th Battalion will fire.  
 8.....  
 K..... Go ahead.



The observer acknowledges:

R----- Wilco.

and when he has identified the area, or weapons therein, he sends:

$\overline{K}$ ----- Go ahead.

From this point on, the procedure is the same as in examples 3 and 4 (*c* and *d* above).

*f. Example 6.*—(1) *Mission.*—An observer, assigned to a battalion of light artillery, has the mission of locating targets and adjusting fire upon them.

(2) *Prearrangement.*—The observer does not check in with any intermediate stations. He reports directly to the battalion. Photographs and maps are not available: the general locations of the target and position areas are known from a previous reconnaissance flight. The position area is to be verified by panels. For establishment of scale and orientation, and identification of base point, a smoke ladder is to be used.

(3) *Communication.*—The observer, having reported, cannot identify the base point; he transmits:

$\overline{BT}$ -----  
 MK----- Mark.  
 BP----- Base point.  
 LA----- Ladder.  
 SM----- Smoke.  
 IX 5-second dash----- Fire.  
 $\overline{K}$ ----- Go ahead.

The ground station replies:

R----- Roger.

and, when the battery fires, transmits:

$\overline{BT}$ -----  
 2-second dash----- Battery fired.  
 $\overline{K}$ ----- Go ahead.

The observer, after seeing the ladder, acknowledges:

R----- Roger.

and then, after observation of the target area, he discovers infantry forming for a counterattack and sends:

BT-----  
 BP----- Base point.  
 800----- Eight hundred.  
 LL----- Left.  
 200----- Two hundred.  
 SS----- Short.  
 JP----- Counterattack.  
 BN----- Request battalion.  
 AD----- Will adjust.  
 K----- Go ahead.

The ground station replies:

R----- Roger.

and as soon as the information is available transmits:

BT-----  
 CN----- Concentration.  
 35----- Three five.  
 BN----- Battalion will fire.  
 A----- A (Affirm) battery (Adjusting).  
 K----- Go ahead.

The observer replies:

h----- Wilco.

When the battery fires, the ground station transmits:

BT-----  
 2-second dash----- Battery fired.  
 K----- Go ahead.

The observer senses and transmits:

BT-----  
 100----- One hundred.  
 RR----- Right.  
 200----- Two hundred.  
 00----- Over.  
 K----- Go ahead.

The ground station replies:

R----- Roger.

The adjustment continues until the observer considers the adjustment sufficiently accurate to request fire for effect. He then transmits:

BT-----  
 20----- Two zero.  
 RR----- Right.  
 CR----- Range correct.  
 FE----- Fire for effect.  
 K----- Go ahead.

The ground station replies:

BT-----  
 FE----- Will fire for effect.  
 2-second dash----- Battery fired.  
 K----- Go ahead.

and then as each of the other batteries fires:

BT-----  
 BA----- Battery.  
 B (C)----- B (Baker) (C) (Cast).  
 FE----- Firing for effect.  
 K----- Go ahead.

The observer may correct the fire of the individual batteries, if this is possible, or correct the massed fire of the battalion as a whole. He may call for fire for effect again, if he believes it necessary, by sending:

BT-----  
 AF----- Request additional fire.  
 FE----- Fire for effect.  
 K----- Go ahead.

If the initial fire for effect was sufficient, the observer transmits:

BT-----  
 RZ----- Mission accomplished.  
 K----- Go ahead.

If there is no further need for the airplane, the ground station replies:

BT-----  
 NF----- No further need of you.  
 K----- Go ahead.

or if there are other prearranged missions, the following is transmitted:

BT-----  
 CT----- Change target.  
 K----- Go ahead.

The observer then looks for other targets and reports when one is located.

*g. Example 7.*—(1) *Mission.*—An observer assigned to the division artillery has the mission of locating targets and adjusting fire upon them, particularly in locations defiladed from forward observers.

(2) *Prearrangement.*—The observer is to report direct to the division artillery commander. He does not check in with any battalions; they are to listen in on the same frequency and tune their sets while listening to the check-in. The observer is furnished a gridded photograph. This photograph covers the division front, but it has not yet been sufficiently controlled by ground survey to permit surveillance of accurate initial fires. The observer knows the call letters and position areas of each battalion. He understands that any one of them may be selected for the adjustment and that more than one of them may fire for effect.

(3) *Communication.*—After establishing communication, the observer discovers infantry assembled in a wooded area, and transmits:

BT-----  
 HM 4 7----- H (Hypo) M (Mike) four dash seven.  
 JA----- Infantry assembled.  
 BN----- Request battalion.  
 AD----- Will adjust.  
 K----- Go ahead.

The division radio replies:

BT-----  
 BN----- 12th Battalion will fire.  
 12-----  
 VA----- That is all.

The battalion with which the observer will work acknowledges receipt of the information given above:

BK9----- BK9.  
 V----- From.  
 AU3----- AU3.  
 R----- Roger.  
 VA----- That is all.

The observer who has heard this now transmits:

AU3----- AU3.  
V----- From.  
AP1----- AP1.  
K----- Go ahead.

The battalion then tells the observer the number assigned to this concentration; also the designation of the adjusting battery. From this point on the adjustment proceeds as in example 6 (*f* above). If, when the observer requests fire for effect, the division artillery commander has decided to place, for example, two battalions on the target, he sends:

BT-----  
BN----- 11th and 12th Battalions.  
11-----  
BN-----  
12-----  
FE----- Will fire for effect.  
K----- Go ahead.

The nonadjusting battalion is furnished the necessary firing data as quickly as possible. Assuming that each battalion will fire when ready, with its batteries in unison, the observer may sense, for example:

BT-----  
BN----- 11th Battalion.  
11-----  
RC----- Range correct.  
BN----- 12th Battalion.  
12-----  
100 LL----- 100 Left.  
RC----- Range correct.  
K----- Go ahead.

The observer then proceeds with his mission as prearranged.

*h. Example 8.*—This example covers a change of frequency by the air observer while in flight; this situation will seldom occur.

(1) *Mission.*—An observer has the mission of locating targets for a groupment of medium artillery, and adjusting fire on these targets.

(2) *Prearrangement.*—The observer is shown, on a battle map, the locations of the position and target areas; no air photographs can be furnished him at this time. Another airplane is already working with the groupment, but he is to check in on the same frequency and await assignment. He is notified of the call signs of the groupment and its battalions.

BT-----	
ZOT-----	Transmit your message(s).
	to.
MZ3-----	MZ3 (battalion call sign).
Z-----	On frequency Z (Zed).
K-----	Go ahead.

R\_\_\_\_\_ Wilco.  
VA\_\_\_\_\_ That is all.

and begins to change the frequency of his radio set. The battalion, having listened in, then transmits to the groupment :

BK9-----	BK9.
V-----	From.
MZ3-----	MZ3.
R-----	Roger.
<u>V</u> A-----	That is all.

**and tunes its set to the specified frequency.**

**After establishing communication with the battalion, the observer discovers a battery in position and transmits:**

BT-----	
2684-----	Two six eight four (battle-map coordinates).
JN-----	Battery in position.
BN-----	Request battalion.
AD-----	Will adjust.
K-----	Go ahead.

The battalion then tells the observer the number assigned to this target; also the designation of the adjusting battery. The procedure is then the same as outlined in example 6 (*f* above).

*i. Example 9.—(1) Mission.*—The observer has the mission of conducting a precision adjustment on a crossroad for the purpose of later interdiction and as a registration for transfers in the vicinity.

(2) *Prearrangement.*—The observer is shown on air photographs the locations of the battalion position area and the crossroad. He is to check in direct with the battalion; no intermediate check-in with a higher headquarters is necessary. He is told that the initial round will be fired with map data corrected.

(3) *Communication.*—After checking in, the observer sends (as prearranged) :

BT-----

K----- Go ahead.

The battalion acknowledges:

R----- Roger.

and when the selected battery has fired, sends:

2-second dash----- Battery fired.

K----- Go ahead.

The observer senses and transmits:

BT-----

30----- Three zero.

LL----- Left.

150----- One five zero.

SS----- Short.

K----- Go ahead.

The ground station replies:

R----- Roger.

and when the battery has fired, sends:

BT-----

2-second dash----- Battery fired.

K----- Go ahead.

The adjustment continues until the battalion commander decides to begin fire for effect. He sends:

BT-----

BQ----- Will fire series of three rounds.

and when the battery has fired, transmits:

BT-----

2-second dash----- Battery fired.

K----- Go ahead.

The observer senses and reports:

BT-----

10----- One zero.

LL----- Left.

SS----- Short.

SS----- Short.

SS----- Short.

K----- Go Ahead.

The elevation is increased one-half a fork, and the ground station reports:

BT-----

2-second dash----- Battery fired.

K----- Go ahead.

The observer senses again and sends:

BT\_\_\_\_\_

SS\_\_\_\_\_ Short.

OO\_\_\_\_\_ Over.

SS\_\_\_\_\_ Short.

K\_\_\_\_\_ Go Ahead.

The ground acknowledges:

R\_\_\_\_\_ Roger.

GO\_\_\_\_\_ Go home.

VA\_\_\_\_\_ That is all.

**35. Procedure for liaison and forward-observer communication.**—*a. General.*—Air-observation methods may be used by forward observers for conduct of fire. The radio procedure is the same; the examples of paragraph 34 are generally applicable.

*b. Transmission of fire commands.*—(1) Fire commands used for conduct of fire, as given in chapter 1, FM 6-40, may be sent direct by radio from the forward observer to the firing battery, provided no other batteries have immediate use for the adjusted data. These commands are not used by an observer in an airplane. When radiotelephone is used, fire commands are transmitted in clear text; when radiotelegraph is used, appropriate groups of the Fire-Control Code are transmitted.

(2) The following shows a set of fire commands which might be transmitted by radio:

<i>Radiotelegraph</i>	<i>Radiotelephone</i>
CA 4800_____	Compass four eight hundred.
CV 4000_____	Converge at four thousand.
FP OP 3_____	On number one open three.
SI 310_____	Site three one zero.
SH_____	Shell.
FQ_____	Fuze quick.
BA_____	Battery.
RR_____	Right.
4000_____	Four thousand.

(4) Fire commands are not repeated back by radiotelephone as they are by telephone. If an element of the commands is not understood, the radio operator asks for a repeat of that element in question after the completion of the set of commands; for example: REPEAT SITE.



# APPENDIX

## FIRE-CONTROL CODE

Paragraph

Encoding section-----	1
Decoding section-----	2

### 1. Encoding section.

<i>Code Group</i>	<i>Meaning</i>
AF	Additional fire; request additional fire; you will receive additional fire.
AP	Aiming point.
JM	Ammunition dump.
AA	Antiaircraft guns.
JI	Antitank guns.
AT	At my command.
BD	Base deflection.
BP	Base point (is).
BN	Battalion; request battalion; battalion will fire.
BA	Battery.
JN	Battery in position.
BY	Battery ready; is battery ready?
BK	Bracket adjustment.
BG	Brigade; request brigade; brigade will fire.
BC	By piece.
JF	Cavalry.
CF	Cease firing; have ceased firing.
CI	Center of impact.
CT	Change target.
CG	Charge (numerals).
CK	Checking communications.
CL	Close (numerals).
CP	Command post.
CA	Compass.
CN	Concentration No. (numerals).
CV	Converge at (numerals).
KR	Corrector.
JP	Counterattack.
JQ	Crossroads.
DF	Deflection.
DV	Division; request division; division will fire.

<i>Code Group</i>	<i>Meaning</i>
DN	Down (numerals).
EL	Elevation.
EN	Enemy (located at ) -----.
ER	Erratic.
FH	Fire concentration No. (numerals).
RZ	Fire effective; mission accomplished.
FE	Fire for effect; will fire for effect.
BQ	Fire (will fire) series of three (3) rounds.
FP	First (No. 1).
FI	Follow instructions (No. -----).
LP	Fourth (No. 4).
FD	Fuze delay.
FQ	Fuze quick.
FR	Fuze range.
GO	Go (going) home; forced to land.
GP	Groupment; request groupment; groupment will fire.
HA	Has battery fired; battery fired.
ID	Identification group, display(ing) (ed).
JA	Infantry assembled (assembling).
JH	Infantry howitzers.
JC	Infantry in column.
JB	Infantry in open.
LA	Ladder.
LM	Lay on me; will lay on you.
LL	Left.
LS	Less.
LF	Lift (to) (from) (at) (No.).
LT	Lost.
JJ	Machine guns.
MK	Mark (identify by fire).
JV	Mechanized vehicles.
MM	More.
JD	Mortar.
MO	Move; moving.
AW	My altitude is ----- feet; what is your altitude?
NF	No further need of you; movement completed; go to next assignment.
NO	No; will not fire.
NC	Normal charge.
OI	Observation impossible.
JO	Observation post.

<i>Code</i>		<i>Meaning</i>
<i>Group</i>		
OP	Open.	
OO	Over.	
PK	Percussion.	
PA	Precision adjustment.	
RN	Range.	
CR	Range correct.	
OB	Ready to observe; request observation.	
RC	Reduced charge.	
RP	Reference point.	
RG	Regiment; request regiment; regiment will fire.	
RA	Repeat range.	
RQ	Request relief.	
RR	Right.	
RJ	Road junction.	
RS	(Numerals) Rounds.	
SP	Second (No. 2).	
SN	Sheaf too narrow.	
SW	Sheaf too wide.	
SH	Shell.	
SS	Short.	
SI	Site.	
SM	Smoke shell.	
SC	Supercharge.	
SV	Surveillance.	
SE	Sweeping.	
JT	Tanks.	
TA	Target.	
TP	Third (No. 3).	
TI	Time.	
JU	Trucks.	
UP	Up (numerals).	
VJ	Verify the adjustment.	
AD	Will adjust; request adjustment on target just reported.	
ZL	Zone (limiting ranges).	
JW	-----	
JX	-----	
JY	-----	
AA	Antiaircraft guns.	
AD	Will adjust; request adjustment on target just reported.	
AF	Additional fire; request additional fire; you will receive additional fire.	

## 2. Decoding section.

<i>Code Group</i>	<i>Meaning</i>
AP	Aiming point.
AT	At my command.
AW	My altitude is ----- feet; what is your altitude?
BA	Battery.
BC	By piece.
BD	Base deflection.
BG	Brigade; request brigade; brigade will fire.
BK	Bracket adjustment.
BN	Battalion; request battalion; battalion will fire.
BP	Base point (is).
BQ	Fire (will fire) series of three (3) rounds.
BY	Battery ready; is battery ready?
CA	Compass.
CF	Cease firing; have ceased firing.
CG	Charge (numerals).
CI	Center of impact.
CK	Checking communications.
CL	Close (numerals).
CN	Concentration No. (numerals).
CP	Command post.
CR	Range correct.
CT	Change target.
CV	Converge at (numerals).
DF	Deflection.
DN	Down (numerals).
DV	Division; request division; division will fire.
EL	Elevation.
EN	Enemy (located at) -----.
ER	Erratic.
FD	Fuze delay.
FE	Fire for effect; will fire for effect.
FH	Fire concentration No. (numerals).
FI	Follow instructions (No. -----).
FP	First (No. 1).
FQ	Fuze quick.
FR	Fuze range.
GO	Go (going) home; forced to land.
GP	Groupment, request groupment; groupment will fire.
HA	Has battery fired; battery fired.
ID	Identification group, display(ing) (ed).

<i>Code Group</i>	<i>Meaning</i>
JA	Infantry assembled (assembling).
JB	Infantry in open.
JC	Infantry in column.
JD	Mortar.
JF	Cavalry.
JH	Infantry howitzers.
JI	Antitank guns.
JJ	Machine guns.
JM	Ammunition dump.
JN	Battery in position.
JO	Observation post.
JP	Counterattack.
JQ	Crossroads.
JT	Tanks.
JU	Trucks.
JV	Mechanized vehicles.
JW	-----
JX	-----
JY	-----
KR	Corrector.
LA	Ladder.
LF	Lift (to) (from) (at) (No.).
LL	Left.
LM	Lay on me; will lay on you.
LP	Fourth (No. 4).
LS	Less.
LT	Lost.
MK	Mark (identify by fire).
MM	More.
MO	Move; moving.
NC	Normal charge.
NF	No further need of you; movement completed; go to next assignment.
NO	No; will not fire.
OB	Ready to observe; request observation.
OI	Observation impossible.
OO	Over.
OP	Open.
PA	Precision adjustment.
PK	Percussion.
RA	Repeat range.

<i>Code Group</i>	<i>Meaning</i>
RC	Reduced charge.
RG	Regiment; request regiment; regiment will fire.
RJ	Road junction.
RN	Range.
RP	Reference point.
RQ	Request relief.
RR	Right.
RS	(Numerals) rounds.
RZ	Fire effective; mission accomplished.
SC	Supercharge.
SE	Sweeping.
SH	Shell.
SI	Site.
SM	Smoke shell.
SN	Sheaf too narrow.
SP	Second (No. 2).
SS	Short.
SV	Surveillance.
SW	Sheaf too wide.
TA	Target.
TI	Time.
TP	Third (No. 3).
UP	Up (numerals).
VJ	Verify the adjustment.
ZL	Zone (limiting ranges).

[A. G. 062.11 (12-20-40).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,  
*Chief of Staff.*

OFFICIAL:

E. S. ADAMS,  
*Major General,  
The Adjutant General.*

DISTRIBUTION:

D 1, 2, 17 (5); B 1, 6 (3); R 1 (5), 6 (10); IBn 1 (8), 6 (3);  
IC 6 (10).

aff.





